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APPLICATION

FOR

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TITLE: CHAIR SEAT TILT MECHANISM

APPLICANT: Ken A. Beggs

CHAIR SEAT TILT MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to a chair control and to a chair incorporating a chair control.

In U.S. Patent No. 5,573,303 to Doerner issued November 12, 1996, a chair control forces the chair seat to tilt forwardly when the backrest is tilted rearwardly. This alleviates circulation problems in an occupant's legs and adjusts the position of the occupant to a more relaxed position. However, an occupant may wish greater control of his or her position.

SUMMARY OF THE INVENTION

In the subject invention, the seat plate of a chair control is pivotably mounted to the main frame so as to be tiltable forwardly and rearwardly. An arm extends from the seat plate and interacts with a stop of the main frame to limit forward and rearward tilting of the seat plate. The arrangement is such that the seat plate has a range of tilting motion irrespective of the tilt of the back bracket for the chair control.

According to the present invention, there is provided a chair control, comprising: a main frame having a stop extending therefrom; a back bracket pivotably mounted to said main frame so as to have a rearward portion tiltable downwardly; a seat plate mounted to said main frame at a main frame pivot so as to be tiltable forwardly and rearwardly regardless of a tilt of said back bracket, said seat plate having an arm extending therefrom such that forward and rearward tilting of said seat plate is limited by interaction of said arm with said stop.

According to another aspect of the invention, there is provided a chair comprising: a chair base; a chair seat; a chair back; a chair control comprising; a main frame mounted to said base, said main frame having a stop extending therefrom; a back bracket mounted to said chair back, said back bracket pivotably mounted to said main frame so as to have a rearward portion tiltable downwardly; a seat plate mounted to said seat, said seat plate mounted to said main frame at a main frame pivot so as to be tiltable forwardly and rearwardly regardless of a tilt of said back bracket, said seat plate having an arm extending therefrom such that forward and rearward tilting of said seat plate is limited by interaction of said arm with said stop.

BRIEF DESCRIPTION OF THE DRAWINGS

In the figures which disclose example embodiments of the invention,

figure 1 is a perspective view of a chair with a chair control made in accordance with this invention,

figure 2 is a partially broken away and partially sectioned side view of a chair control made in accordance with an embodiment of this invention shown in a first position,

figure 3 is a rear view along the lines 2-2 of figure 2,

figure 4 is a side view of the chair control of figure 2 shown in a second position,

figure 5 is a side view of the chair control of figure 2 shown in a third position,

figure 6 is a partially broken away and partially sectioned side view of a chair control made in accordance with another embodiment of this invention shown in a first position, and

figure 7 is a rear view along the lines 7-7 of figure 6.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referencing figures 1 and 2, a chair 11 has a chair control 10 mounted on a spindle base 20 and attached to seat 13 and back 15. Referencing figures 2 and 3, chair control 10 comprises a main frame 12, a seat plate 14, and a back bracket 16. The seat plate 14 and back bracket 16 are pivotably attached to the main frame by main frame pivot 18. The main frame 12 is mounted to spindle 20 of the chair. The chair seat is affixed to seat plate 14 and the back 15 to back bracket 16.

The upper end of an arm 22 is pivotably mounted at the rear of seat plate 14 by seat plate pivot pin 24. The lower end of the arm 22 has a slot 26 which receives a shaft 30 carried by the main frame. A series of arms 32 are pivotably mounted to the back bracket 16 by back bracket pivot pin 34. The lower end of each arm 32 has a slot 36 which receives shaft 30. The arms 32 are interleaved with plate washers 38 received on shaft 30.

A plate 40 fixed to shaft 30 acts as a compression member at one side of arms 32. A sleeve 42 acts as a second compression member at the other side of arms 32. A cam (not shown) can be operated to displace shaft 30 with respect to sleeve 42 so as to draw compression member 40 toward compression member 42.

A pair of tensioned coil springs 50 is mounted between seat plate pivot pin 24 and shaft 30. In conventional fashion, a tensioned spring (not shown) within housing 52 is mounted between main frame 12 and back bracket 16.

With reference to figures 1 to 3, in operation, an occupant of the chair 11 may lean back, overcoming the spring in housing 52, so that the rear portion of back bracket 16 tilts downwardly until the top of slots 36 of back bracket arms 32 abut shaft 30. In this fully reclined position of the back bracket, the occupant may shift his or her weight forwardly or rearwardly to cause the seat plate 14 to tilt forwardly or rearwardly between the solid line and ghost line positions of the seat plate shown in figure 2. As shown in figure 2, with the back bracket in its fully reclined position, the forward tilting of the seat plate is limited by the under surface 54 of the top portion of seat plate 14 stopping against the nose 56 of back bracket 16. As seen in figure 4, with the back bracket in its fully

reclined position, the rearward tilting of the seat plate is limited by the top of slot 26 of seat plate arm 22 stopping against shaft 30 of the main frame. Springs 50 (figure 3) urge the seat plate 14 toward its fully rearwardly tilted position.

If the occupant subsequently leans forwardly in the chair, the rear portion of the back bracket 16 tilts upwardly under the urging of the spring in housing 52 until the lower end of slots 36 of back bracket arms 32 stop against shaft 30, as shown in figure 5. In this unreclined position of the back bracket 16, as shown in figure 5, the seat plate 14 may tilt forwardly until the bottom of slot 26 stops against shaft 30. With the back bracket in its unreclined position, the seat plat may tilt rearwardly until pivot pin 24 of seat plate arm 22 stops against abutment surface 58 of back bracket 16.

With reference to figure 3, the back bracket may be locked in any reclined position by operation of the cam (not shown) which draws compression plate 40 toward sleeve 42 in order to frictionally engage back bracket arms 32 with plate washers 38. It will be noted that with the back bracket locked in position, the seat plate 14 remains free to tilt forwardly and rearwardly.

From the foregoing description, it will be apparent that an absolute limit for forward and rearward tilting of the seat plate 14 is defined by the interaction of the slot 26 in the seat plate arm 22 with the main frame shaft 30, which acts as a stop. However, if the back bracket has been tilted downwardly beyond a certain point, the forward tilting of the seat plate is further limited by the seat plate abutting the nose 56 of the back bracket. And if the back bracket has been moved toward its unreclined position beyond a certain point, the rearward tilting of the seat plate is further limited by the seat plate pivot pin 24 abutting back bracket surface 58. Therefore, by choosing the length of the nose 56 and the maximum spacing between seat plate pivot pin 24 and back bracket surface 58, the range of tilting motion of the seat plate for various positions of the back bracket may be set.

Figures 6 and 7 illustrate a second embodiment of a chair control, wherein like parts have like reference numerals. In chair control 110, a series of arms 122 are pivotably attached to seat plate 14 by pivot pin 24. These arms interleave with arms 32 of back bracket 16 at shaft 30. In consequence, when a cam (not shown) moves compression

plate 40 toward sleeve 42, arms 32 and 122 are frictionally engaged to lock both the seat plate 14 and back bracket 16 in position. In this manner, an occupant may lock in a desired tilt for the seat and back rest of the chair. In all other respects, the chair control 110 operates in the same fashion as the chair control 10 of figures 2 to 4.

While the absolute limit of the forward and rearward tilt of the seat plate has been described as set by the interaction of arm 22 or arms 122 with shaft 30, other arrangements may be envisaged to accomplish this purpose. For example, an arcuate arm may rigidly depend from seat plate 14 and two spaced fingers extend transversely of the arcuate arm. With this arrangement, the upper finger may abut a pin stop extending from the main frame 12 to define the maximum rearward tilt of the seat plate and the lower arm abut the seat plate to define the maximum forward tilt of the seat plate.

While the nose 56 and abutment surface 58 have been described as the features of the back bracket which may further limit forward or rearward tilting of the seat plate, the back bracket could be configured so that it has other features which provide these further limitations. For example, the back bracket may have upward protrusions which, dependent upon the reclined position of the back bracket, the seat plate may abut as it tilts forwardly or rearwardly.

Other modifications will be apparent to those skilled in the art and, therefore, the invention is defined in the claims.